Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Improving Public Safety Communications in the 800 MHz Band	)	
	)	
	)	
Consolidating the 900 MHz Industrial/Land Transportation and Business Pool Channels	)	WT Docket No. 02-55
	)	

REPLY COMMENTS OF THE CELLULAR TELECOMMUNICATIONS & INTERNET ASSOCIATION

CELLULAR TELECOMMUNICATIONS & INTERNET ASSOCIATION

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SUMMARY

CTIA maintains that providing Public Safety with 21st Century state-of-the-art wireless capabilities is of paramount importance in improving Public Safety communications in the 800 MHz band. The wireless industry remains committed to working with Public Safety and the other licensees in the 800 MHz band to resolve interference problems through a multi-faceted, comprehensive approach that will require immediate, short-term and long-term measures. In its Reply Comments, CTIA reiterates that it does not support the Nextel proposal. Instead, CTIA supports an alternative approach whereby the Commission adopt a cohesive action plan that incorporates three broad proposals for mitigating interference: 1) relocation of 800 MHz Public Safety/Critical Infrastructure users to the 700 MHz band; 2) interim rebanding within the 800 MHz band, and 3) improved Public Safety equipment and interference mitigation efforts.

CTIA explains how the relocation of Public Safety/Critical Infrastructure licensees from the 800 MHz to the 700 MHz band is the best way to resolve interference concerns and at the same time achieve a successful long-term Critical Infrastructure Plan. CTIA also recommends interim rebanding of the 800 MHz band as a way to help alleviate interference concerns prior to relocation of Public Safety to the 700 MHz Band. Finally, CTIA provides several proposals and recommendations with respect to affirmative steps that Public Safety can take to mitigate such interference and improve their radio communications systems.

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The Cellular Telecommunications & Internet Association ("CTIA")[1] hereby submits its Reply Comments in response to the Commission's *Notice of Proposed Rulemaking* ("*NPRM*") to remedy interference to the 800 MHz band Public Safety systems from commercial operations in the band.[2] The Commission's *NPRM* seeks comment on a band restructuring proposal submitted by Nextel and other alternatives that might alleviate the 800 MHz interference problems.[3]

In its Comments, CTIA opposed Nextel's band restructuring proposal and proposed an alternative approach that would significantly improve Public Safety communications in the 800 MHz band.[4] Many commenters, including CTIA, do not support the Nextel proposal because it

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[1] CTIA is the international organization of the wireless communications industry for both wireless carriers and manufacturers. Membership in the association covers all Commercial Mobile Radio Service ("CMRS") providers and manufacturers, including cellular, broadband PCS, ESMR, as well as providers and manufacturers of wireless data services and products.

[2] *In re Improving Public Safety Communications in the 800 MHz Band*, WT Docket No. 02-55, *Notice of Proposed Rulemaking*, (rel. March 15, 2002) (*"NPRM"*).

[3] *See* Promoting Public Safety Communications – Realigning the 800 MHz Land Mobile Radio Band to Rectify Commercial Mobile Radio – Public Safety Interference and Allocate Additional Spectrum to Meet Critical Public Safety Needs ("Nextel Proposal") (Nov. 21, 2001).

fails to fully remedy the interference problems, and it does not provide adequate long-term solutions or a funding mechanism for resolving the interference problems being experienced in the 800 MHz band.[5] In its Comments, CTIA recommends both reallocating the 700 MHz band for Public Safety and replacing legacy Public Safety radios as the most appropriate course of action to resolve the interference problem.[6] The Commenters propose a broad range of alternatives that include very divergent approaches. For example, the International Association of Fire Chiefs, Inc. and the International Municipal Signal Association recommend that the Commission conduct empirical research to determine the effectiveness of any proposals for band

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[4] *See Improving Public Safety Communications in the 800 MHz Band*, WT Docket No. 02-55, Comments of the Cellular Telecommunications & Internet Association, filed May 6, 2002, at 4-6 ("CTIA Comments").

[5] *See* CTIA Comments, at 6-7. *See also Improving Public Safety Communications in the 800 MHz Band*, WT Docket No. 02-55, Comments of the Office of the Chief Technology Officer, Government of the District of Columbia ("OCTO Comments"), at 4-6; Comments of the State of Maryland, Department of Budget and Management, Office of Information Technology ("Maryland DBM/OIC Comments"), at 3-6; Comments of U.S. Cellular, at 4-6; Comments of Southern LINC ("Southern Comments"), at 44-47, 50-57; Comments of Verizon Wireless, at 2, 12-17; Comments of AT&T Wireless Services, Inc. ("AWS Comments'), at 20-22; Joint Comments of Cingular Wireless, LLC and ALLTEL Communications, Inc., at 11-15; Comments of Motient Communications, at 12-15; Comments of Kenwood Communications Corporation ("Kenwood Comments); at 10-12; Comments of the Ad Hoc Wireless Alliance, at 3; Comments of the American Electric Power Company, Inc. ("AEPC Comments"), at 4-6; Comments of the Duke Energy Corporation, at 7-8; Comments of American Petroleum Institute ("API Comments"), at 10-11; Comments of the National Rural Electric Cooperative Association ("NRECA Comments"), at 9-11; Comments of Snohomish County, WA Emergency Radio System, at 1; Comments of TRW-Ohio MARCS Program Office ("TRW-Ohio MARCS"), at 2.

Many Commenters appear reluctant to fully support either the Nextel Proposal or the NAM Proposal. For example, Bergen County Police Department acknowledges that while the Nextel proposal is a positive step, the Proposal has significant flaws. *See* Comments of the Bergen County Police Department, at 4-5. *See e.g.* Comments of the Arizona Department of Public Safety, State of Arizona ("Arizona DPS'), at 4 (acknowledging that the Nextel Proposal is complex, expensive and may or may not fully resolve the interference problem; Comments of the City of Austin, Texas ("City of Austin Comments"), at 3 (noting that both the Nextel and NAM proposals require significant enhancements).

[6] *See* CTIA Comments, at 6-7.

restructuring. They also propose several guiding principles that the Commission should use to evaluate any proposals.[7] The variety and inconsistency among these proposals vividly demonstrate the technical and regulatory challenges associated with restructuring the band in a way that significantly improves the interference problems, while at the same time not creating an unfair burden, or advantage, for existing licensees within the 800 MHz bands. The wireless industry, however, remains committed to working with Public Safety and the other licensees in the 800 MHz band to resolve interference problems through a multi-faceted, comprehensive approach that will require immediate, short-term and long-term measures.

There is no dispute among the Commenters that the safety of American lives and property depends on the Public Safety community's ability to provide reliable, interoperable, interference-free, and spectrally efficient wireless communications systems during emergency situations and disasters. The events of September 11th and the President's subsequent homeland security initiatives underscore the need for a comprehensive Federal plan that provides a practical, coherent yet a multi-faceted course of action to address the problems associated with harmful interference in the 800 MHz band. Such a plan, however, must provide a reasonable

[7] *See* Comments of the International Association of Fire Chiefs, Inc. and International Municipal Signal Association ("IAFC/IMSA Comments") at 3-5, 7-8. *See also* Comments of Motorola, at 3- 4 (recommending specific principles for evaluating transition proposals); OCTO Comments, at 6-10; Comments of the Commonwealth of Virginia, Department of Information Technology, at 5 (suggesting that the FCC should set aside spectrum for voluntary public safety migration); Maryland DBM/OIC Comments, at 7-10 (proposing plan to resolve the interference problem that would essentially relocate digital CMRS systems to the 700 MHz band); Bergen County Police Department Comments, at 6 (recommending a broader scope whereby FCC adopt an approach and remedy that encompasses all public safety, not just those in the 800 MHz band); Comments of the State of Hawaii, at 2 (recommending "Hawaii Alternative" whereby next-generation cellular services would move to the upper 700 MHz band and public safety would move to 824-860 MHz band; Motorola iDEN systems should be "given" spectrum in the 1990-2165 MHz band; and reclaimed spectrum should be sold to traditional B/ILT licensees); Comments of Exelon Corporation, at 8 (recommending a "market-based", "specific incident" approach); Comments of Private Wireless Coalition ("PWC Comments"), at 13-23.

balance between Public Safety needs and efficient spectrum management. CTIA submits that these goals are not mutually exclusive, because the measures Public Safety users can take to fulfill their responsibility as licensees to be spectrum efficient can at the same time also improve the performance, reliability and security of their Public Safety networks.

While commenters have proposed numerous solutions and divergent approaches, CTIA recommends that the Commission adopt a cohesive action plan that incorporates three broad proposals for mitigating interference: 1) relocation of 800 MHz Public Safety/Critical Infrastructure users to the 700 MHz band; 2) interim rebanding within the 800 MHz band, and 3) improved Public Safety equipment and interference mitigation efforts.

I. Relocation of Public Safety/Critical Infrastructure Licensees From The 800 MHz To The 700 MHz Band Is The Best Means Of Resolving Interference Concerns And Achieving A Successful Long-term Critical Infrastructure Plan.

The challenge the Commission must consider in this proceeding is how improving Public Safety communications in the 800 MHz band supports the broader Critical Infrastructure Protection Plan, efficient spectrum management, and its statutory obligation to rationally justify the amount of spectrum made available for Public Safety use. CTIA believes that the relocation of all Public Safety licensees from the 800 MHz to the 700 MHz band is the best means of achieving these goals.

As part of a Critical Infrastructure allocation, it may also be prudent to relocate some other 800 MHz incumbents, such as some Business/Industrial & Land Transportation ("B/ILT") licensees, from the 800 MHz band to the 700 MHz band. These licensees are currently in many cases adjacent to Public Safety users, and often provide support for those Public Safety functions. Moreover, B/ILT licensees provide many Critical Infrastructure functions that could

most effectively be provided in close proximity to the Public Safety licensees in the 700 MHz band.

Relocation of these users to the 700 MHz band may also provide additional cyberspace security benefits to the networks used by providers of national security and emergency preparedness (NS/EP) services. From a wireless security perspective, the predominant concern is the integrity of the transmission. In the commercial wireless environment, more than 90% of the transmissions employ a digital transmission over the air interface, as well as hardware and user authentication. The overwhelming majority of Public Safety and B/ILT networks, in contrast, are analog networks, and interception of these NS/EP communications can be readily accomplished with inexpensive, commercially available scanners. Adoption of a digital platform for interoperable NS/EP communications in the 700 MHz band would be a major, positive step in assuring the security of these user networks.

Moreover, while commentary has focused on the need for interoperable communications among traditional public safety users, many B/ILT licensees support other, equally important critical infrastructure functions, such as transportation, energy, health care, and hazardous materials removal. These functions should also be incorporated into the overall interoperability capabilities of a new, extended NS/EP requirement. This need for inter-sector communications interoperability is being identified by all the critical infrastructure sectors in the upcoming National Strategy for Secure Cyberspace as an issue that must be addressed. CTIA submits that progress on this issue could be achieved through the process of relocating some B/ILT, as well as Public Safety, licensees in the 800 MHz band to the 700 MHz band.

CTIA acknowledges that the Commission currently does not have the statutory authority to reallocate spectrum in the 700 MHz band, and obtaining such authority will require a concerted joint effort by both the industry and the Public Safety community. CTIA would actively support Federal legislation to enable the Commission to reallocate *and* clear spectrum in the 700 MHz band, provided that the spectrum is specifically set aside as a relocation band for Public Safety/Critical Infrastructure uses.

Perhaps the most daunting challenge to resolving interference problems in the 800 MHz band is determining how the cost of any transition should be borne. Several commenters representing public safety organizations express concern about the costs associated with any relocation, and oppose any efforts to impose such costs on Public Safety.[8] Similarly, CTIA and other industry commenters oppose any approach that imposes involuntary costs on CMRS carriers and their customers.[9] In its comments, CTIA proposed that the funding of any Public Safety relocations be accomplished through public funds or through some other approach that does not impose involuntary costs on wireless carriers and subscribers.[10]

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[8] *See* Comments of the City of New York, at 2-3; OCTO Comments, at 4-6; Arizona DPS Comments, at 4; Comments of the Public Safety Improvement Coalition ("PSIC Comments"), at 3, 5; Comments of New Jersey Transit, at 2; Comments of the City of Baltimore, at 1; Comments of the Michigan State Police Communications Division, at 1-2; Comments of the San Diego County-Imperial County Regional Communications Systems, at 3; Bergen County Police Department Comments, at 6-7; State of Hawaii Comments, at 1; Comments of the County of Maui, at 6; IAFC/IMSA Comments, at 5; TRW-Ohio MARCS Comments, at 9; Comments of Utah Communications Agency Network, at 3, 4; Comments of Madison County East Transit District, at 7.

[9] *See* CTIA Comments, at 2, 6, 8-9; Verizon Wireless Comments, at 2, 12-17; U.S. Cellular Comments, at 6-7; Southern Comments, at 14-22; Joint Comments of Cingular Wireless and ALLTEL, at 14-15; Motient Comments, at 9-11.

[10] *See* CTIA Comments, at 2.

The approach CTIA advocates in these Reply Comments of relocating Public Safety and some B/ILT licensees from the 800 to the 700 MHz band offers a solution to the vexing funding problem. CTIA proposes that any spectrum vacated by Public Safety and B/ILT in the 800 MHz band should be auctioned, and the proceeds used to fund Public Safety and B/ILT relocation to 700 MHz, where they could deploy a state-of the-art wireless emergency network in that band. This approach will ensure that the steps necessary to resolve Public Safety interference problems and provide upgraded performance are fully funded, and ensure that additional spectrum is made available to the CMRS industry to meet its urgent need for additional spectrum to serve its subscribers' needs.

II. Interim Rebanding of the 800 MHz Band May Help Alleviate Interference Concerns Prior to Relocation of Public Safety To the 700 MHz Band.

While the Commission and Congress undertake efforts to reallocate spectrum in the 700 MHz band and provide for the orderly relocation of incumbents, the Commission should also consider undertaking interim steps to address the 800 MHz interference concerns. Specifically, CTIA recommends that limited rebanding of the 800 MHz band could be appropriate if: (1) it can be demonstrated that the rebanding will significantly reduce harmful interference; (2) the Commission makes every effort to minimize the costs of such rebanding, including examining the use of upgraded, dual-band equipment for Public Safety; and (3) no CMRS carrier is *required* to contribute to the cost of the rebanding. Except for Nextel, which has voluntarily offered to contribute $500 million to assist in remedying the 800 MHz interference problems, no CMRS carrier should be required to contribute to the interim rebanding, as they would not be involved in that process. To the extent the costs associated with such limited rebanding exceed the $500 million already offered by Nextel, CTIA recommends that financing the remaining costs must come from public funds or homeland security appropriations.

Any rebanding of the 800 MHz band by relocating incumbents within the band must be accomplished in a way that minimizes harmful interference, and ensures each licensee involved in the rebanding maintains its current operational capabilities and subscriber capacity. Commercial licensees in the band, including Nextel, should not receive additional spectrum inside or outside of the 800 MHz band without having to pay for such spectrum through the auction process.

III. Improved Public Safety Equipment and Interference Mitigation Efforts Can Help Address Interference to Public Safety Operations.

Several commenters, including CTIA, delineate steps that CMRS providers can take to ameliorate the interference problems that certain Public Safety users are experiencing from commercial operations.[11] CTIA and other commenters also provide some proposals or recommendations with respect to affirmative steps that Public Safety can take to mitigate such interference and improve their radio communications systems.[12]

Recently, CTIA convened a group of technical experts from several CTIA member companies, to develop mitigation strategies that would assist Public Safety as well as industry in addressing Public Safety interference issues. These experts made certain findings and recommendations of additional specific steps that could help mitigate interference to Public Safety operations in the 800 MHz band. As a general matter, the technical experts noted that, given the successful track record of good faith case-by-case mitigation, the Commission should maintain and encourage joint efforts by Public Safety and the industry to resolve interference problems. The Commission can limit its role to those cases, if any, where industry-led

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[11] *See* CTIA Comments, at 7-8;

[12] *See* CTIA Comments, at 7-8; Verizon Wireless Comments, at 2, 8-10; AWS Comments, at 8.

mitigation efforts are not successful in resolving the interference. These experts also made several specific recommendations, including that the Commission: 1) initiate improvements in Public Safety handsets by adopting more rigorous testing standards for Public Safety equipment; 2) require Public Safety to adopt robust systems designs that take into consideration redundancy and margin of safety; 3) grant regional spectrum coordinators flexibility on the contour requirements to allow Public Safety organizations to increase power where it does not interfere with other Public Safety operators; and 4) educate Public Safety users on solutions and practices identified in the Best Practices Guide and on the limitations of the handset and network designs they use today.

The first recommendation proposes introducing more rigorous testing for radios, specifically testing for intermodulation ("IM") interference in a strong-signal environment. Higher performing Public Safety radios are more resistant to interference. Public Safety should be encouraged to use portable radios with Class A receiver specifications as defined by the Telecommunications Industry Association ("TIA") for public safety services. Vendors and the marketplace should be encouraged to develop and embrace performance enhancements on future radios that would further improve the radio's performance in an interference-limited environment. Given that the new generation dual-band handsets operating in the 700 and 800 MHz Public Safety band have the potential to be more susceptible to IM interference, it is increasingly apparent that the Commission must take steps to improve Public Safety handset equipment. Public Safety's continued reliance upon traditional noise-limited systems, using

radios that span widely separated bands, merely increases the sensitivity of radios to IM interference.[13]

Furthermore, when the Commission assigns spectrum without giving due consideration to receiver design, the conflict between CMRS and Public Safety designs will be exacerbated. To ameliorate interference problems and address the strong-signal environment, CTIA strongly recommends the modification of the TIA 603 standard to include rigorous testing for analog radios, including testing in a strong-signal environment. The equivalent for digital radios is the set of TIA/EIA 102 CAAA and TIA/EIA 102 CAAB, with CAAA being the methods of measurement and CAAB the minimum specifications. In its current state, these TIA standards are inadequate and do not reflect the heavily utilized spectrum that most Public Safety systems operate in today.

Second, the Commission should require Public Safety to adopt robust systems designs that include redundancy and margin of safety in their loss budget. The Public Safety community continues to purchase systems designed under the Commission's regulation to operate noise-limited at the edge of the defined service area. CTIA believes that Public Safety should benefit from proven CMRS techniques that will work in strong signal environments. These include: designing Public Safety systems for in-building coverage; adopting interference-limited designs increasing the signal level at the edge of the service area; and increasing the number of base stations or repeaters. Several Public Safety systems (recent examples include Los Angeles and Washington, D.C.) did not work acceptably until more sites were installed. The Commission should also encourage redundancy and reliability in Public Safety system design, *e.g.,* the use of

[13] These new generation models use extra-wide front-end filters that increase the susceptibility to interference problems.

Simulcast channels. Presently, Public Safety can manually jump to a second simulcast channel when a signal is poor; however, the Commission should require Public Safety to install backup, and require vendors to provide intelligent handsets that can do this automatically where one is available.

Third, the Commission should grant flexibility to regional spectrum frequency coordinators on the 40 dBu contour requirement[14] and allow the frequency coordinator to use alternative interference protection measures outside of the 40 dBu contour on a case-by-case basis to allow higher signal strengths. The current regulation stipulating a 40 dBu level at the edge of the service area does not provide sufficient latitude to provide reasonable reliability (90%) to portables. 40 dBu may be sufficient for in-car mobiles, but portables have inefficient antennas that lower the desired signal to the receiver. The less effective antenna does, however, have some positive attributes, *i.e.,* this also lowers the interference and IM-generating interference signals are attenuated by the order of the product. Accordingly, a -3 dBd antenna provides a 9 dB reduction in the IM product for third order intermodulation.

Finally, the Commission should increase Public Safety awareness of the Best Practices Guide. Mobile data systems being planned by Public Safety are more sensitive to RF interference than analog voice systems, which are experiencing interference today. Data systems

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[14] For the 800 MHz band, the 40 dBu boundary limits were recommended in the Final Report of the National Public Safety Planning Advisory Committee (NPSPAC). The FCC adopted this Final Report in an Order in the FCC's proceeding that implemented the NPSPAC (821-824) MHz band (Docket No. 87-112). The specifics of implementation were left to each of the 55 Regional Planning Commissions to implement.

In practice, Public Safety Radio System operators installing new systems or planning to raise the power output of existing installations, submit applications to the FCC designated regional spectrum planning commissions. A 40 dBu contour is calculated based on the particulars of the transmitters and repeaters proposed in the system. If the contour exceeds the systems coverage area, the applicant must typically apply for a waiver.

require better C/(I+N) values to achieve their throughput. Carrier systems have the same issue. As more complex modulations are used, the desired signal has to be increased to achieve these C/(I+N) performance values. Once again, if the field strengths can be raised, then many technical innovations can be deployed that currently will not work in purely noise-limited systems at the edge of their service area. CMRS radios use attenuators in the front end. However, in a noise-limited system, the desired signal is already too low to undergo further attenuation. Public Safety needs to ensure that their mobile data systems are designed to operate in a strong signal environment. In addition, the Commission should educate the public safety community on limitations of the vintage handset and network designs they continue to use -- designs that cannot tolerate the noise and congestion common to any modern RF environment.

CONCLUSION

For the reasons set forth in its Comments and these Reply Comments, CTIA respectfully requests that the Commission adopt CTIA's proposals to improve Public Safety communications by mitigating interference in the 800 MHz band and by efficient use of Public Safety spectrum.

Respectfully submitted,

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